



NOTES

CORONAVIRUSES

MICROBE OVERVIEW

- Causes respiratory infections
- OC43, NL63: most common strains of human coronaviruses (HCoV)
- **Associated clinical syndromes:** common cold, pneumonia, bronchitis, Middle East respiratory syndrome (MERS-CoV), severe acute respiratory syndrome (SARS-CoV)

Genetic material

- Positive-stranded RNA viruses

Taxonomy

- Corona: crown; named after spiked appearance in electron microscopy
- **Genera:** alpha, beta (human pathogens), gamma, delta

Morphology

- Helical capsid; enveloped (outer lipid membrane)
- Structural proteins
 - Small envelope protein (E) → viral assembly
 - Hemagglutinin esterase protein (HE) → binds to cell membrane (beta coronaviruses only)
 - Membrane protein (M) → viral assembly
 - Nucleocapsid protein (N) → forms nucleocapsid
 - Spike protein (S) → binds, fuses with host cell membrane

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CORONAVIRUS (SARS)

osms.it/coronavirus-SARS

PATHOLOGY & CAUSES

- Causes severe respiratory syndrome (SARS)
- **B-beta coronavirus**: viral pulmonary disease
- Viral inoculation of respiratory tract mucosa → cell damage → release of cytokines (interferon-gamma, IL-1, IL-6, IL-12) → inflammation, ↑ secretions
- **Incubation period**: 2–7 days

CAUSES

- Direct contact, airborne droplets, fomites

RISK FACTORS

- Immunosuppression, healthcare-related occupation, comorbid conditions

COMPLICATIONS

- Acute respiratory distress syndrome, multiorgan failure

SIGNS & SYMPTOMS

- **Prodrome**: fever, malaise, headaches, myalgia, chills
- Non-productive cough, dyspnea, chest pain
- Diarrhea, rhinorrhea, sore throat

DIAGNOSIS

- Center for Disease Control and Prevention (CDC)
 - No alternative diagnosis after 72 hours of clinical evaluation
 - Individual at risk

DIAGNOSTIC IMAGING

Chest X-ray

- Interstitial pulmonary infiltrates

LAB RESULTS

Histologic pulmonary tissue observation

- Hyaline membranes, edema, fibroblast proliferation

Reverse-transcriptase polymerase chain reaction (RT-PCR)

- Nasopharyngeal, oropharyngeal, stool, serum samples

Serologic tests

- Enzyme-linked immunosorbent assays (ELISA)
- Fluorescence antigen detection assays

Lab tests

- Lymphopenia, thrombocytopenia, ↑ lactate dehydrogenase (LDH), ↑ alanine aminotransferase (ALT)

TREATMENT

OTHER INTERVENTIONS

- Mechanical ventilation in respiratory failure

Prevention

- Hand washing
- Proper disposal of infected materials (e.g. used tissues)
- Mask use within healthcare environment